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Set#	Query
L1	float$3 with rate$1 with note$
L2	variable with rate with obligation$
L3	taxable with float$3 with rate$1 with note$

L4	debt adj3 obligation$2
L5	(tax adj exempt) with bond
L6	municipality
L7	collateral
L8	purchas$3 with asset$2
L9	variable adj rate adj demand adj obligation$
L10	security with interest$1
L11	(interest investment) with default
L12	l1 and l2 and l5 and l6 and l7 and l8 and l10 and l11
L13	l1 or l3
L14	l2 or l4 or l9
L15	l10 or l11
L16	l13 and l14 and l15
L17	l5 and l16
L18	l6 and l16
L19	l7 and l16
L20	l8 and l16
L21	l5 and l6 and l7 and l8
L22	l21 and l16

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Abstract:

Credit derivatives have grown from less than $200 billion in 1997 to more than $2 trillion in 2002. Furthermore, they are projected to more than double by 2005 and represent the fastest-growing segment of the credit market. As with most new instruments, a full understanding of their risks is frequently missing. Concerns expressed by Warren Buffet and Fitch, for example, highlighting the problems with these rapidly growing, illiquid instruments have surfaced. They are correct that these complex instruments are opaque and difficult to value. Thus, they can produce unintended

results including higher risk levels than the underlying cash market alternative. Nonetheless, properly handled, CDs represent a useful means of participating in the credit market. This article will outline a framework to understand the risk issues inherent in the widening use of such instruments.

Text:

Credit derivatives (CDs) have grown from less than $200 billion in 1997 to more than $2 trillion in 2002. Furthermore, they are projected to more than double by 2005 and represent the fastest-growing segment of the credit market. Initially used by financial institutions from a risk and regulatory capital management perspective, they have developed into a new credit-risk-asset class. Credit-asset investors now can choose between the cash and derivative credit markets. In fact, many institutions prefer to acquire credit exposure in the derivatives markets than in the cash primary or secondary markets based on relative value, funding, and ease of execution considerations. This has improved both the liquidity and pricing efficiency of credit assets.

As with most new instruments, a full understanding of their risks is frequently missing. This leads to surprises when institutions find that they have assumed more or different types of risk than originally envisioned. Concerns expressed by Warren Buffet and Fitch, for example, highlighting the problems with these rapidly growing, illiquid instruments have surfaced. They are correct that these complex instruments are opaque and difficult to value, particularly since they trade in the volatile, unregulated over-the-counter market.1 Thus, they can produce unintended results including higher risk levels than the underlying cash market alternative. The prob-lem is magnified by concentration of derivative credit exposure in a small number of financial institutions. Nonetheless, properly handled, CDs represent a useful means of participating in the credit market.This article will outline a framework to understand the risk issues inherent in the widening use of such instruments.

The Market Setting

Setting

Demand growth in derivative credit assets is driven primarily by nonbank institutional investors seeking leveraged access to an underrepresented credit-asset class. These investors, hedge funds and insurance companies, have favored countercyclical debt over traditional equity investments. Since derivatives allow investors to separate funding from credit risk, they can present a more efficient means of acquiring credit risk than cash market debt instruments. Thus, banks seeking credit protection sellers to balance their portfolios against concentrations and deterioration by effectively shorting a credit have found an active market.

Banks have moved beyond risk management to using CDs to acquire and trade credit risk.2 They compare the prices available in the cash, primary and secondary, markets with the derivatives market. Many syndicate banks view the derivatives market as a relative-value benchmark comparing the all-in loan spread plus expected ancillary relationship income with the derivative rate. Syndicators are responding to weak primary syndications for thinly priced relationship-type transactions by using the derivatives market to reduce excess concentrations. In effect, a form of synthetic syndication has developed. The originating institution retains the legal exposure and funding risk. It sells the credit risk to synthetic syndicate members through a CD. Consequently, the complementary CD market is enforcing cash market pricing discipline and increasing cash market liquidity as the markets become more closely linked.

In addition, banks have recognized the need for an active CD focus to

serve the sell side and operate in the secondary cash market for both loans and bond credit assets. In essence, derivatives serve as a key, allowing structuring institutions to open the doors separating markets to achieve the best client execution. Many institutions have combined their cash and derivatives functions to trade or sell credit as an asset class and not just the underlying loans, bonds, or derivatives separately.

Market

CDs are instruments whose value is derived from the performance of an underlying reference asset. The major instruments include total return swaps (TRS),3 credit-linked notes (CLNs),4 credit default swaps (CDS),5 and collateralized **debt obligations** (CDOs).6 Major participants include banks, dealers, insurance companies, money managers, and hedge funds. Recent extensions involve CD indices such as the European iBoxx, swaps, and options on indices. For purposes of this article, the focus is on the major instruments, CDS and CDOs.

Limited market liquidity makes credit derivative instruments difficult to value on a traditional market-to-market basis. Thus, a mark-to-model approach is frequently employed. This increases the level of accounting and valuation risk. Furthermore, market-making liquidity is highly concentrated in the top five institutions.7 This leads to a potentially volatile market.

The transparency and liquidity issues, among others, complicate the evaluation of CD performance. Perceived credit-rating arbitrage opportunities, two similarly rated instruments trading at different prices, may involve unidentified risk factors rather than true arbitrages or relative-value advantages. This is reflected in the poor performance of many CD investors. A framework identifying risk factors, and determining whether the user has been appropriately compensated and protected, is needed. This requires an examination of collateral, structure, counterparties, and documentation.

FIGURE 1

Risk Matrix

Risk Framework

Principles

The conservation of risk principle highlights that risk never disappears. Rather, it either is transferred to another counterparty or is transformed.8 Thus, it is important to focus on the type of risk and who retains it in complex derivative transactions (Figure 1). Frequently billed as reducing risk, many derivative credit exposures have unrecognized risks leading to unintended consequences.9 Currently, CDs are billed as the modern approach to risk management and the preferred form of credit-risk exposure. This creates a herding effect by users who do not wish to be left behind in the search for yield or protection. These users are, however, subject to adverse selection. The user with the lowest risk estimate will have the highest concentrations in the instruments.This can be compounded by the difficulty in assessing high-impact, low-frequency events. Investors are frequently lulled into a false sense of security by overweighting recent events and underweighting unlikely possible exposures. In behavioral terms, this is known as disaster myopia and is responsible for many well-known failures, including Long Term Capital Management. Failure to distinguish a risk expectation, which is usually historically based from the larger scenario-dependent risk exposure, can lead to losses.10

The key principles are as follows:

* Never allow rare events to become fatal; avoid concentrations and excessive leverage.

* Limit the downside; understand the consequences of the downside as the upside will take care of itself.

* Understand the source of the return; determine whether the perceived excess return or risk transfer is real or merely due to some unmeasured rigk factor.

* Risk spreads reflect more than expected loss; liquidity and technical factors may overwhelm expected loss.

* Beware of survivorship bias; the record of successful CD users

overstates their success rate as the unsuccessful efforts are ignored.

We will turn to an application of these principles to CDs.

Market Application

Application of these risk principles is complicated in the young, rapidly growing, illiquid CD markets. Being traded over the counter, they are customized and lack transparency. Next, both the investor base and liquidity providers are highly concentrated. Thus, pricing tends to be determined more by technical than fundamental factors making mark-to-market calculations problematic. Consequently, marking-to-model is often used to value CDs. The models, however, are data dependent.

FIGURE 2

Structure of a Credit Default Swap

Data problems complicate the pricing or valuation decision. Independent data are difficult to obtain in the over-the-counter market. It is frequently provided by the dealers themselves. Next, there is a relatively short history of data, as the instruments are relatively new.The data also are skewed by differing default definitions and credit mitigation issues.

Frequently, the result of these problems is mispriced risk. Many insurance companies that sold credit protection and investors who invested in subordinated CDO tranches, for example, have suffered disappointing returns due to mispricing. Furthermore, institutions like Credit Suisse have incurred large losses on credit default swaps (CDS) such as British Rail.This leads shareholders in CD market makers to extract an uncertainty discount reflected in lower price-earnings multiples for these firms. This situation should improve once pricing and disclosure becomes more transparent. This will require a move away from over-the-counter to exchange-traded derivatives, albeit with a loss of some flexibility.

In addition to pricing and model risk, other risk issues to consider include the following:

* Credit risk: Risk of counterparty default and credit mitigation.

* Liquidity risk: Unexpected payouts and thin secondary market conditions can complicate meeting obligations at a reasonable price.

* Operational risk: Settlement deadlines and collateral monitoring errors can affect claims.

* Legal and documentation risk: Nonstandardized clauses may increase risk exposure and transaction costs.

* Regulatory risk: Involves the capital treatment of the exposure, which is heightened by planned Bank for International Settlements (BIS) II changes.

* Accounting risk: Income volatility from mark-to-market adjustments and balance-sheet consolidation issues, which are complicated by recent accounting changes such as International Accounting Standard No. 39.

Finally, credit derivatives can unexpectedly transfer tax benefits and liabilities between the parties.

Adding to the problem is the separation of functions between the economic pricing and institutional risk factors. Those valuing the instruments frequently fail to understand the structuring implications of the complex legal, tax, accounting, and regulatory rules that motivate the transactions. Armed with this framework and market understanding, we will now examine in detail the major credit derivative tools, CDS and CDOs.

Credit Default Swaps

CDS are the dominant credit derivative instrument. Single-name CDS comprise almost one-half of the market. The typical mechanics of a CDS are illustrated in Figure 2. In a CDS, the protection buyer pays a fee for the right to receive a contingent payment from the protection seller following an agreed-upon credit event concerning a refer-ence obligation over a given term. Terms can range up to 10 years with the five-year term being the most liquid. Notional amounts per contract usually range between $5 million and $10 million with up to $100 million for more liquid **investment** -grade names possible.

FIGURE 3

Credit **Default** Swap Quotes April 23, 2003

The largest sellers are insurers and financial guarantors. Banks represent the largest buyers, although more banks are moving toward selling protection as an alternative credit-asset origination tool. According to Fitch, the five most cited reference entities are General Motors, Ford, Daimler Chrysler, General Electric, and France Telecom. Market and contract-specific information for the more liquid 100 to 250 reference entities is provided by major participants.

Figure 3 presents a sample of market prices provided by ABN AMRO, April 22, 2003, for autos and auto parts."

Quotes on less well followed entities are available on request.These quotes reflect both fundamental and comparable value factors. The major fundamental factors include the following:

* Maturity: Fees vary directly with maturity.
* Counterparty rating: Fees vary directly with counterparty rating.
* Probability of credit event: Depends on both the type of event and its frequency.
* Recovery following credit event: Reflects loss given credit event.
* Default correlation between counterparty and reference obligation: Lower correlations imply higher fees.
* Liquidity: More liquid reference entities have tighter pricing.

Comparable value factors are based on spread differentials among similar firms with equivalent ratings. For example, the substantial spread difference between Ford and General Motors reflected in Figure 3, both BBB autos, could signify a temporary relative-value opportunity or something more fundamental.

CDS are predominately settled by physical delivery of the least expensive instrument.12 Once a credit event has occurred, the protection buyer purchases the instrument selling at the highest discount to par and delivers it to the protection seller at par. Settlement mechanics require notification of the credit event supported by evidence of public announcement of the event and position closing within proscribed times.

As with any insurance product, payment is based on the coverage definition or, in the case of CDS, the definition of default or the credit event. This definition can be complex. It can run several pages in a loan agreement.Yet, for CDS, which use a shorter amended International Swap Dealer Association (ISDA) form, this complexity is sometimes overlooked.

FIGURE 4

Structure of a Collateralized **Debt Obligation**

Credit events can be categorized as follows:

* Hard events: Bankruptcy and failure to pay.
* Medium events: Default and payment acceleration.
* Soft events: Reference firm or obligations have been restructured. This involves changes in a reference obligation's rate, term, amortization, or priority as part of a financial restructuring.

The hard and medium events are typically beyond the protection buyer's control and, thus, present limited issues. The softer restructuring events, however, can be influenced by buyers. They give rise to moral hazard problems in which buyers can trigger a credit event and payout even though no default or economic loss has occurred.

This unexpected consequence was illustrated in 2001 with the Xerox restructuring. Xerox's bank group agreed to extend its loan to solve a liquidity problem. In exchange, the bank group received collateral, thereby enhancing its position. This was reflected by improved secondary loan prices. Nonetheless, Xerox bonds declined in value after being effectively subordinated to the restructured loan. Banks that had acquired protection declared a credit event, purchased Xerox bonds at a 30 percent discount, and presented them for par to the protection sellers. The protection sellers found that they were exposed to an unrecognized legal risk whereby they covered both default and credit deterioration risk. They mispriced the risk by failing to understand the risk factors.

In response to this problem, the ISDA documentation has evolved. The

options, effective May 2003, now include full restructuring language as in Xerox, modified restructuring with limitations on deliverables upon a restructuring, and exclusion of restructuring as a credit event. A pricing differential of 15 percent to 20 percent exists between the full and no-restructuring language. We can expect other legal risk and documentation issues to surface given the complexities of loan agreements compared to the ISDA. Undoubtedly, they will be resolved over time as the market evolves but not without more traps for the unwary, such as Xerox.13

The current CDS market is evolving. The unexpected credit-quality decline among fallen angels such as Enron, WorldCom, and Global Crossing affected protection sellers. Firms such as Swiss Re and Scor have suspended further activity, while others, including General Re and Zurich Financial, have curtailed efforts. These early participants suffered from overexposure in a new market in which they mispriced risk.

Protection sellers have responded by challenging bank protection buyers from benefiting from insider information. They allege that the Chinese wall separating banks as credit providers with access to insider information and their CD trading desks is porous. Banks are believed to use this access and information to discover credit problems before they become public. They then use this information to purchase credit protection from unsuspecting sellers without properly disclosing this preexisting condition.This gives rise to a classic lemon-selling problem, which could harm the future development of the market.14

An additional problem stems from the lack of disclosure and limited regulatory oversight. Hedge funds, for example, can use the CDS market to influence equity prices. They can use the leading indicator nature of CDS to create the appearance of a credit problem to drive down a firm's stock price. This may have occurred in 2002 with MBIA. More than $1 billion of CDS were purchased by a hedge fund in a short time.This caused CDS spreads to widen and raised the question of a looming credit problem, which depressed their stock price. Regulators are investigating this potential abuse. This may lead to increased regulation.

The net effect of the above is increased CDS pricing. This reflects providers' pricing more rationally to better reflect risks than achieve market share. In addition, short-term liquidity may be curtailed by the withdrawal of some traditional participants.

Collateralized **Debt Obligations**

Collateralized **Debt Obligations** (CDOs), the second major credit derivative instrument after CDS, are securities backed by a diversified pool of exposures.15 The securities credit-risk exposures are based on their seniority or tranche in the overall capital structure. The market totals $1 trillion in outstandings with annual issuance exceeding $250 billion. Transaction size and maturity can exceed $10 billion and 10 years, respectively. Figure 4 depicts a generalized CDO.

The various CDO types are based on the following characteristics:

* Market execution. Cash transactions are funded exposures acquired in the cash market. Synthetics are unfunded exposures acquired in the derivatives market. They represent a hybrid combination of derivative and securitization technology.

* Purpose. (1) Balance sheet: Used primarily by banks to reduce regulatory capital. Assets are transferred to the special-purpose vehicle (SPV) with the seller taking back the first loss exposure. (2) Arbitrage: Money manager **purchases asset** exposures based on a given capital structure. Its profit is the spread or arbitrage between the asset returns and funding costs.

* Credit structure. (1) Cash flow: Portfolio principle and interest used to repay tranche holders. (2) Market value: Trade to increase value, which is used to repay tranche holders.

Despite the many variations, CDO substance remains the same. Portfolio credit risk is transferred. Securities are issued with differing seniority. Income is distributed top down, to the senior-most instruments. Losses are distributed bottom up, to the junior-most instruments. Thus, the collateral

risk profile is altered through tranching, the sequential ordering of priorities. This enhances liquidity as a wider investor group is accessed.

There are three key risk considerations involved with CDOs.The first concerns the asset class. CDO assets can include the following:

* High-yield bonds
* Commercial and industrial loans
* Emerging-market and sovereign debt
* Asset-backed debt (all seniorities)
* Investment-grade debt
* Distressed debt
* Equity

Each asset class has varying degrees of liquidity and credit risk, which affect realized values available to various CDO tranche holders. For example, loan collateral generally has a superior liquidation value compared to high-yield bonds, given its senior secured position. Thus, CDOs weighted with loans have outperformed those weighted with bonds in the current stressed credit environment.

The next consideration is structure. Equity levels for synthetic CDOs were 2 percent compared to 4 percent for cash transactions.This was based on their perceived lower risk due to shorter tenors, higher diversification, and lower interest-rate and par-accretion risk. Unfortunately, actual performance illustrates that the 2 percent equity level is insufficient, reflected in the large number of synthetic downgrades. The significant equity difference underlies their dominance, more than 75 percent of the 2002 volume, in synthetic structures. This factor fuels CDS growth and illustrates the convergence of the instruments. Other important structural features include capital structure complexity and seniority, control over payouts, and trading restrictions.16

Perhaps the most important consideration facing CDO investors is the quality and experience of the asset manager. The focus is on asset-class expertise, investment strategy, track record, and transparency. Investors have been harmed by asset managers' temptations to invest in cheaper or riskier assets within a rating class. Ultimately, this leads to a higher-risk portfolio. The difficulty in placing the junior CDO tranches, the highest-risk components of the capital structure, leads some sponsors to subsidize their origination efforts by retaining the junior instruments themselves. The performance of the difficult-to-value junior tranches is at best mixed. Retaining such tranches to subsidize origination efforts appears unattractive given some high-profile problems. For example, in 2001,Am Ex suffered large losses relating to the first-loss tranches in CDOs they had originated. Am Ex consequently terminated the activity.

As with related CDS, the current credit environment has affected CDOs. Downgrade pressure on single names like El Paso, which suffered a same-day 5-notch downgrade, and fallen angel defaults, for example, WorldCom, have triggered numerous CDO downgrades. Especially affected are low-equity synthetic CDOs using bond assets given their lower recovery values and thin equity cushions. Almost 10 percent of the CDO market has been downgraded, including many AAA instruments. An active secondary market had developed for depressed, formerly AAA instruments. Some of these instruments are being used as collateral for new CDOs. Overall, the market has reacted well with improved structures and forcing out new or weaker asset managers.

Conclusion

Credit derivatives represent a relatively recent development. They have moved beyond risk management to become a new credit-asset class.They do, however, suffer from problems concerning their use. These include pricing, documentation, credit, and liquidity concerns. Standardized, transparent, exchange-traded instruments that can be marked to market are needed for the market to move to the next stage of development.

The current focus should be on appropriate risk identification and compensation. Bank investors should be concerned about credit and rating arbitrage opportunities. Frequently, they are more apparent than real. Hopefully, the risk framework outlined in this article can help distinguish

the opportunities. Nonetheless, this rapidly growing market promises to enhance credit-market liquidity and risk-based pricing.

Derivatives allow structuring institutions to open the doors separating markets to achieve the best client execution.

Credit default swaps are the dominant credit derivative instrument.

Perhaps the most important consideration facing CDO investors is the quality and experience of the asset manager.

Notes

1. Over-the-counter markets are similar to an eBay-type market using bilateral arrangements. Regulated organized exchanges operate as multilateral clearing platforms using standardized contract and settlement procedures. It is interesting to note that, while over-the-counter CDs continue to grow rapidly, exchange-traded contracts have declined.

2. "Global Credit Derivatives: Risk Management or Risk," Fitch, Mar. 10, 2003, highlights a large and growing number of banks acquiring credit-risk exposure through the derivatives market.

3. In a TRS, the protection buyer pays the cash flow received on the asset plus capital appreciation and receives a **floating rate** plus any capital loss. Effectively, credit and market risks are transferred.

4. CDNs arc **notes** linked to the performance of a reference asset. Essentially, they constitute a synthetic bond with a CD embedded in the structure. They are useful for investors subject to limits on derivative holdings.

5. CDS represent an insurance-type product when the buyer pays a fee for the right to receive a contingent payment based on a defined credit event concerning a reference asset.

6. CDOs are securities backed by a diversified pool of credit assets including loans, bonds, or derivatives.

7. During a May 8,2003, speech at the Chicago Federal Reserve Bank, Alan Greenspan, stated while recognizing the benefits of CDs, expressed his concern over the liquidity and credit concentration issues flowing from the limited, and declining, number of major derivative dealers. He noted that one dealer accounts for about one-third of the global CD market, while just a "handful of dealers" account for two-thirds, with JP Morgan Chase as the largest dealer.

8. For example, the taking of collateral transforms the risk from credit to operational concerning the valuation, monitoring, and perfection of the collateral interest.

9. The current Securities and Exchange Commission (SEC) Chairman, William Donaldson, noted this point in 1992, when he stated, "No matter how much hedging is done, someone ends up holding the hot potato when the music stops."

10. Warren Buffet highlights the importance of considering exposure risk in his Berkshire Hathaway 2001 Annual Report.

11. The CD market provides a useful leading indicator of credit-quality information with widening spreads reflecting possible credit concerns.

12. The alternative cash settlement, par less the market value of the defaulted reference obligation based on a dealer poll, is used in less than 30 percent of CDS settlements.

13. The newly enacted ISDA definitions are already subject to dispute involving the demerger of Six Continents. At issue is the interpretation of "successors" to a demerger. More than $500 million of CDS are at risk of becoming worthless.

14. If the market perceived that banks are buying CDS protection only for future problems, then it will bid accordingly. Buyers will find prices unattractive for quality credits. Consequently, they will seek protection only for problem credits.

15. Other CDO forms include collateralized bond obligations (CBOs) and collateralized loan obligations (CLOs).

16. A recent development is the Moody's trustee surveillance issue.

Moody's was concerned over a perceived lack of trustee involvement in the National City default case. Consequently, Moody's will pay closer attention to trustee responsibility. This may mean lower ratings for weaker trustee roles.

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Abstract:

This paper examines the characteristics of the typical fixed-rate mortgage product in four countries and the concomitant interest rate risks and costs that they imply for the consumer. In each instance the funding, and therefore the potential duration mis-match, is handled in a different fashion. The role of the national government also varies with regard to **interest** rate regulation, **interest** rate risk management, and the management of mortgagor **default** risk. The benefits and drawbacks of the various systems from the home owner's perspective are examined. The US system is the only one that allows a home owner to fix their mortgage interest rate for a long term and allows the borrower to refinance with no notice, no pre-payment penalty, and at any time for any reason. Moreover, the US has the least government interference and one of the highest home ownership rates in the world at one of the lowest costs for the consumer. The countries considered are Denmark, Canada, the US, and the Netherlands.

Text:

INTRODUCTION

This paper examines the characteristics of the typical fixed-rate mortgage product in four countries and the concomitant interest rate risks and costs that they imply for the consumer. In each instance the funding, and

therefore the potential duration mis-match, is handled in a different fashion. The role of the national government also varies with regard to **interest** rate regulation, **interest** rate risk management, and the management of mortgagor **default** risk. In our summary section we examine the benefits and drawbacks of the various systems from the home owner's perspective. The U.S.A. system is the only one that allows a home owner to fix their mortgage interest rate for a long term and allows the borrower to refinance with no notice, no pre-payment penalty, and at any time for any reason. Moreover, the U.S.A. has the least government interference and one of the highest home ownership rates in the world at one of the lowest costs for the consumer. We think that the latter two beneficial circumstances are consequences of the consumers' ability to fix the interest rate for long periods of time and the low cost of the embedded pre-payment option. In a sense, the core of the paper is summarized in Table 1 while the rest is explanation. The countries we consider are Denmark, Canada, the U.S.A., and The Netherlands.

THE BASIC FUNDING SOURCES: EUROPE VS. AMERICA

European property and mortgage markets are structurally very different from each other and the North American markets. They differ in the diversity of the types of lenders and in their mortgage product variety. Property and mortgage markets remain intrinsically domestic in Europe even though the European Union is moving toward the creation of a potentially deep and liquid single capital market. While the European capital markets fund house purchases with mortgage bonds and mortgage-backed securities, time and demand deposits remain the most common source of funds for lending purposes (e.g., deposits with agreed upon maturity, deposits redeemable at notice, or overnight deposits). The European Monetary Fund estimates that retail deposits fund about 65% of residential liens with approximately 60% of mortgage credit still being granted by mortgage-specific firms1.

A very common European funding method is via mortgage-backed bonds. They were first issued during the eighteenth century and they can vary quite a bit. Mortgage-backed bonds are secured debt securities issued by mortgage credit institutions supported by certain types of assets, usually residential mortgages, that remain on the balance sheet of the issuer. The originating institution retains the credit risk associated with the underlying mortgages. It may be removed by the use of a synthetic credit-linked derivative much more complex than the guarantee fee mechanism used in the mortgage-backed security (or via a senior/subordinate structure). The use of mortgage-backed securities (MBSs), by contrast, involves the sale of liens and their removal from the originating institution's balance sheet. With an MBS the originating firm retains any excess interest over the all-in cost of the securitization but removes the loans and any associated capital requirement from its balance sheet. This is the dominant form of providing funds for residential home **purchasing** in the U.S.A.

Because of the nature of the **assets**, and the accompanying enabling legislation, a mortgage-backed bond (MBB) provides its holder with a special degree of security. This dramatically reduces the default risk to the bond holder. Hence, the issuance of MBBs allows lenders to obtain funding at a reduced cost thereby making it a cost-effective technique for home loan funding. In Europe the issuance of MBBs is the second most important type of funding method after retail deposits. About 25% of residential liens outstanding are supported in this fashion1.

Interest rate risk management and the role of the national government is briefly indicated in Table 1. We will discuss each country's basic mortgage product, funding mechanisms, methods of insuring against **default** (though not local underwriting criteria), and **interest** rate risk in turn. In our final section we review each country to examine the complexity, costs, and benefits to their home owning publics.

OVERVIEW OF THE DANISH MORTGAGE MARKET

The dominant mortgage product in Denmark is a fixed-rate, long-term,

fully-amortizing, level-payment, periodic-paying, no penalty pre-payable, mortgage. While this product appears similar to the one ascendant in the American market, it is very different in two important ways. First, Danish mortgage banks are prohibited from assuming interest rate risk. Second, there is the potential for - compared to the U.S.A. - enormous financial complexity at the consumer level. This stems from the choices a potential home owner has to make regarding the raising and disbursement of their home-buying funds and the mechanisms they might utilize to protect themselves against interest rate risk. The Danes utilize MBBs to fund home acquisition. They have no MBS market.

The traditional Danish mortgage carries a fixed-rate and maturity option of 10-30 years. However, with the recent large drop in market rates, adjustable, short-term home loans have become increasingly popular both denominated in Danish krone (DKK) and in the euro (and tied to EURIBOR).

LEGISLATION AND FUNDING

Denmark's various Mortgage Credit Acts define mortgage credit activities as the granting of loans against registered mortgages on real property from the capital obtained by issuing bonds with the value equivalent to the home loans. The current Mortgage Credit Act (MCA) requires that a mortgage bank have minimal interest and foreign exchange rate risk; an interest rate risk no more than 1% of its capital base for a market rate change of one percentage point and a exchange rate risk of not more than an amount equal to 10 bp (= 0.1%) of its capital base. The MCA also stipulates that mortgage loans for owner-occupied dwellings may not be re-paid over a period longer than that of a 30-year annuity (i.e., fully-amortizing) loan. Most Danish mortgages are fixed-rate liens supported by callable bonds.

The Basic Rules

The basic lending rules of the Danish MCA are divided into three parts2:

* The maximum maturity of the loans is thirty years.
* The maximum loan-to-value ratio for single-family dwellings is 80%, and
* The valuation of the property must be market-determined and conservative.

The following three principles characterize Danish mortgage credit2:

* All home loan lending is financed through the issuance of MBBs that are listed on the Copenhagen Stock Exchange.
* The mortgage banks must observe the balance principle. It ensures an equilibrium between payments received from borrowers and payments made to MBB holders (principal and interest), and
* The lending rate is market based.

In theory the mortgage banks in Denmark issue MBBs with the same nominal value and interest rate as the principal and the note rate on the home loans that the bonds finance. (These MBBs are usually issued on an open, or "tap", basis.) Each bond has a unique identification code. Re-payments of principal made by borrowers on loans require that an equal amount of face value of the bond with the same identification code be withdrawn from circulation. Thus, lending and the corresponding increase in the face value of an open series of MBBs take place under an exact balance between payments from the underlying mortgages and their matching MBBs. Therefore, the only risk of a mortgage bank is credit risk.

TODAY'S MARKET

About 55% of the Danish population resides in owner-occupied dwellings. This is low by European standards; the European Union average is over 60%. This may be a consequence of the large quantity of subsidized rental housing and the high quality of social housing dwellings. Amended tax rules have also greatly influenced the home ownership rates. The ability of individuals to deduct interest payments on home loans has been significantly reduced to 32% of their interest payments as compared to 65% in 1985(2).

The Danish MBB market is among the largest in the world relative to

Gross Domestic Product. The total amount in circulation is more than DKK 1.9 billion, approximately twice Denmark's Gross Domestic Product. MBBs amount to about 60% of their bond market. MBBs represent 80% of fixed-income securities listed on the Copenhagen Stock Exchange. The six largest MBB series represent more than 40% of the total of all MBBs outstanding.

The Danish mortgagor preference for housing funds has shifted over the last decade. Between 1990 and 1993 the mix of fixed-interest mortgages were about 60% annuity and 40% serial loans for owner-occupied homes2. Annuity loans have constant periodic payments and are the most frequently used product type. With a serial form of lien the home owner makes equal principal payments. As a consequence the interest component steadily decreases.

From mid-1993 until recently fixed-interest annuity (i.e., fully-amortizing) loans have been the predominant product form. Loans can be granted to borrowers as either cash or bond loans. Until the latter half of 1996 the source of funds borrowers preferred was cash loans. For bond loans the principal of the mortgage is equal to the nominal amount of the MBBs issued to finance them. The interest payments on the lien correspond to the coupon payments on the MBBs. For a cash loan the principal amount equals the market value of the bonds and the interest rate corresponds to the yield-to-maturity. Most new home loans are being granted as bond loans because of a tax law amendment. Bond or cash loans for residential purchase can be granted in annuity or serial forms. Today the vast majority of home loans takes the form of fixed-interest bond loans2. Since 2000 home equity loans have become available; they are known as mortgage equity withdrawal loans.

After 1996 the new version of an adjustable-interest mortgage was introduced. These variable-rate liens typically have an amortization term of 20- to 30-years and are re-paid by the annuity principle. However, their funding is based on short-term, non-callable bonds with a life time of 1- to 11-years but mostly 1- to 5-years2. This means that the outstanding amount needs to be refinanced by the borrower on a current basis. The mortgagor may choose whether the adjustable-rate loan has a fixed payment or a fixed term-to-maturity. Adjustable, short-term loans can have one, four, or twelve payment dates per year. Since 2000 an interest maximum guarantee has been available (i.e., one can buy an interest rate cap on an adjustable-rate mortgage).

Variations Among Loan Types

The vast majority of liens in Denmark are annuity though serial payment and bullet (i.e., non-callable) loans are also granted. Fixed-rate interest loans usually have four annual payment dates. The majority of fixed-rate mortgage loans can be pre-paid at par. In Denmark the term pre-payments covers all terminations at par - both immediate, complete, principal re-payments and those notified in advance (so that redemption occurs on a coupon payment date)-less any annulled MBBs. (An annulled MBB is one that the mortgage bank purchases in the secondary market to maintain the balance principle.) For the adjustable, short-term products the borrower takes out an annuity loan with a 20- or 30-year amortization term. The interest rate is altered at regular intervals, usually on January 1.

Home Loan Costs

In Denmark borrowers are charged a (credit) risk and administration fee by the mortgage bank. This fee covers management expenses (i.e., servicing), loan losses, real estate tax payments, and a contribution to the bank's reserves. The fee is charged throughout the life of the lien, on every payment date, and is 50-100 bp of the outstanding debt. The fee depends on the category of property, the security ranking of the loan, its size, and its maturity. It is tax deductible to the mortgagor. It appears that this fee is a significant component of the mortgage banks' profits as they cannot earn money off the spread between their cost of funds and the note rate on a lien.

PRE-PAYMENTS

The balance principle of the Danish MCA requires that all mortgage banks redeem MBBs, on a current basis, equivalent to their borrowers' ordinary re-payments and any extraordinary redemptions. The former represent extra principal amounts that will be re-paid on a regular payment date with the bank being notified in advance. The latter represent extra principal amounts that will be re-paid on other than an ordinary settlement date without prior warning to the mortgage bank3. The information on pre-payments is updated and rapidly published enabling investors to better assess their pre-payment risk.

In the case of immediate redemption the borrower is not required to wait to buy back their home loan until the next settlement date. However, the borrower must pay the mortgage bank the interest amount lost over the period from the actual date of redemption until the (ordinary settlement) date as of when the lien could have been redeemed were it a notified pre-payment. Callable loans may be redeemed with the appropriate MBBs; alternatively the borrower can redeem the loan for an amount equivalent to the outstanding MBB debt at par value. While the normal procedure is notified redemption at par of the MBBs, or the equivalent amount of funds, the market price of the MBBs should not be ignored. Indeed, the factor determining the choice of cash redemption on an ordinary settlement date or redemption via bonds without notification is whether the market price of the bonds associated with the home loan to be paid off is above or below par. MBBs selling at a discount can offer a less expensive alternative to pre-payment (remember that the interest differential will be due in this instance).

OVERVIEW OF THE CANADIAN MORTGAGE MARKET

The Canadians primarily use a fixed-rate, short- to intermediate-term, partially-amortizing, level-payment, periodic repaying, mortgage instrument with a pre-payment penalty, for their home loan. Considerable volatility along the Canadian yield curve has resulted in a movement away from a long-term, fixed-rate, mortgage product to a short- or medium-term outlook. Even though the interest payment is not fixed, these are all still long-term, fully-amortizing, mortgage products. Moreover, the Canadian Federal Government has been, and continues to be, much more involved in the primary mortgage market than is the case in the U.S.A. For example, in Canada one out of three homes has mortgages which are Government-insured. In addition, the Government both provides monies for home loans by borrowing in the capital markets (and used to set home loan rates)4. Finally, Canada has a small, and very recent, MBS market and an even smaller and newer MBB market. Hence, the bulk of the funding for mortgages is the time and demand deposits of retail bank customers4.

LEGISLATION

As in the U.S.A., during the early part of the twentieth century Canadian mortgage financing was characterized by high down payment, short-term, interest-only, home loans. These were paid periodically (generally monthly) for a set period of time. Partial re-payments of principal seldom occurred; rather, the entire, original, principal balance was to be re-paid (or refinanced) upon maturity. Since these liens had a substantial down payment requirement, the mortgagor's income was the **security** for the periodic **interest** payments and the property served as protection for the debt (i.e., the principal amount). Following the failure of this system during the Depression a new home loan product wherein periodic payment of both interest and principal occurred during the term of the home loan became the standard. This is the familiar, fixed-rate, long-term, fully-amortizing, level-payment, periodic-paying, mortgage. This product type was the rule in residential mortgage lending for almost thirty-five years (ca. 1935-19704).

Default Insurance

Another major innovation during the period 1935-1970 was the use of default insurance. To increase the supply of funds for home loan purchases the Government motivated financial institutions to increase their participation by reducing the risk of loss in the event of default. The

Canadian Government continues to insure against default today. Borrowers pay fees into an insurance fund established and managed by the Government. Monies from this fund are used to compensate lenders when default occurs. The insurance program played a major role in attracting new lenders to the mortgage market, particularly the chartered banks4.

More on Legislation

The Canadian Mortgage and Housing Corporation Act (1945) established the Canadian Mortgage and Housing Corporation (CMHC) as a Crown Corporation (implying that its **debt obligations** carry the full faith and credit guarantee of the Government of Canada) to administer, on behalf of the Government, the Federal participation in housing as described by the National Housing Act of 1944. The CMHC provides mortgage credit Insurance to protect National Housing Act (NHA) "Approved Lenders" from default. Today the CMHC (and GE Capital), much as Ginnie Mae in the U.S.A., insures MBS owners against default by the issuers/servicers as well as the mortgagors.

Over time, to bring about an increase in private funds and shift toward private lending, three major innovations were introduced in the various revisions of the NHA. In 1954 joint lending was replaced by Government-insured loans with the full amount of the funds to be provided by commercial lenders. The CMHC acts as the insurer and charges a one time fee varying with the loan-to-value ratio. The CMHC's underwriting standards will only allow a borrower to spend up to 32% of their gross income on shelter obligations and no more than a total of 40% on shelter and nonshelter related periodic financial obligations combined (the corresponding conforming loan percentages are 28% and 32% respectively in the U.S.A.)

Secondly, the Bank Act was changed to permit chartered banks to lend on insured mortgages. The chartered banks and Quebec saving banks, as well as insurance, loan, credit union, and trust companies are approved lenders. After this change an increased supply of home loans became available almost everywhere in Canada.

Finally, in 1967, the Bank Act was amended to remove the interest rate constraint that had been imposed on mortgagees. At the same time the banks were permitted to participate in the conventional and NHA-insured mortgage markets. Provision was also made to establish a secondary market for insured loans to both supply an increasing amount of monies for residential home purchases and to enhance the liquidity of whole loan trading4.

Inflation

At the end of the 1960s a rapid inflation corresponded to a period of rising consumer demand. Nominal interest rates rose and long-term lenders found themselves faced with a huge duration mismatch. Moreover, in Canada, individual borrowers had been protected by interest rate caps granted by the Canada Interest Act. Mortgage lenders had no such protection from being locked-in to long-term loans at interest rates below the higher, current ones. The 31% (9% per year to 11.8% per year) increase in conventional note rates in the three-year period commencing January, 1972 illustrates the amplitude of the problem. The 75% (12.5% per year to 21.5% per year) rise that occurred between September, 1979 and September, 1981 exacerbated the difficulty4.

Such dramatic increases in monthly mortgage payments, particularly during the 1982 recession, had severe consequences for home ownership in Canada. This can be seen by the claims made on the default insurance funds established under the various National Housing Acts. From the fund's inception the default insurance fund grew steadily with revenues consistently exceeding expenditures. However, starting in 1979 and continuing to 1983, claims greatly exceeded revenue. For example, in 1983 revenue to the fund was $89.4 million while expenses were $349.7 million4. To accommodate lenders a new form of lien was developed known as a partially-amortized mortgage and it emerged as the most general form of home loan. This instrument passes intermediate-term interest rate risk to the home owner.

With this vehicle the lien amortizes over a long period of time but matures, that is reprices, on a short- or intermediate-term basis. At maturity the full amount of the outstanding balance must be re-paid or refinanced at the market interest rate.

Because the short-term, partially-amortized, mortgage permits the periodic re-adjustment of note rates this allows the lenders to better match the interest rates that they offer on their liabilities (e.g., time and demand deposits plus a multitude of Guaranteed Investment Contracts) and their assets (e.g., mortgages). Of course it simultaneously forces the home owner to bear the burden of interest rate volatility. In an attempt to reduce the turmoil caused by this instability, the Government introduced an interest rate insurance program in 1984. Borrowers could purchase insurance against having to make payments based on an interest rate that is more than a specified number of percentage points greater than the rate specified in the original mortgage (i.e., they could buy an **interest** rate cap).

Independently, the CMHC launched a new program in 1987-the NHA Mortgage-Backed **Security** (MBS). This program was designed to help provide a steady flow of mortgage funds into housing in Canada by increasing liquidity in secondary market trading. The NHA MBS was explicitly modeled after the U.S.A.'s Ginnie Mae version. Today there is about $75 billion outstanding in this form (roughly 5% of the market4). The CMHC's role was expanded to include the provision of the unconditional guarantee of timely payment of interest and principal when pools of these insured mortgages were created. This CMHC guarantee is in effect a guarantee of the Government of Canada.

Mortgage Funding

The residential mortgage market has been increasingly funded by the banks; rising almost linearly from 11% in 1971 to 55% in 1996(4). The principal source of funds for home buying in Canada is the deposits of the Canadian populace. The banks primarily use some version of a Guaranteed Investment Certificate (GIC) to entice savers to invest in products which provide monies for home purchasing. These GICs come in a wide variety of forms.

Lenders cannot normally make a loan which is more than 75% of the market value of a house unless the lien is insured by the CMHC or GE Capital. Mortgage default insurance may be available for loans up to 95% of the property's value. The residential mortgage market comprises approximately one-quarter of Canada's domestic capital markets. The Canadian homeownership rate is about 65% while over half of Canadian households own their own homes outright4. In Canada, neither real estate tax payments nor mortgage interest is tax-deductible.

LOAN TYPES and PRE-PAYMENTS

An "Open Mortgage" typically has a 6-month or 1-year term. This product allows borrowers to re-pay, at any time, without a pre-payment penalty. A "Closed Mortgage" normally has a 1- to 5-year term (but typically a 25-year amortization period). The fixed-rate product can be paid at a frequency varying from weekly to monthly. This type of lien cannot be pre-paid nor discharged before the end of its term without the borrower having to pay a significant penalty (typically three months' interest) except on the sale of their property (a "due-on-sale" clause). Closed mortgages may have a penalty-free pre-payment option of 10-20% of the original principal amount or a maximum monthly "double-up" payment solely allocated to outstanding principal balance reduction. There are many other variations.

A "Variable-Rate Mortgage" or "Adjustable-Rate Mortgage", with a term of 6-months to 1-year, has an interest rate directly linked to money market rates. With a variable-rate mortgage the monthly payments are still fixed but, as the current interest rate goes up, a larger portion of the regularly scheduled payment will be applied toward the interest component; the converse would apply in a falling interest rate scenario.

The up front costs of home buying in Canada are comparable to those in

the U.S.A. The lack of mortgage interest and real estate tax deductibility raises the effective ongoing cost by the home owner's marginal tax rate. In addition, the absence of a long-term, fixed-rate lien passes interest rate risk onto the home owner.

OVERVIEW OF THE U.S.A. MORTGAGE MARKET

The basic instrument in the U.S.A. was created by the Federal Housing Administration seventy years ago; it is the fixed-rate, fully-amortizing, long-term, monthly-paying, level-payment, no pre-payment penalty, mortgage with an American-style call option embedded in it. Although there is no national housing legislation in the U.S.A. comparable to that in Denmark or Canada, there has been Federal Government involvement, in several ways, to minimize default risk and to enhance liquidity in the secondary market. As a result, the residential housing finance system in the United States has evolved from several different components.

To understand the current American mortgage market one needs to remember the crisis in the Savings and Loan associations, or thrifts, during the 1980s and before that the problems which stemmed from the Depression. Between the 1930s and 1970s the thrifts funded long-term, fixed-rate, liens on the basis of short-term, and hence variable-rate, deposits. The result was a lack of liquidity and duration mis-match resulting from the mistake of borrowing short-term and lending long-term. Nonetheless, this system worked well in a time of stable interest rates. Many thrifts collapsed after 1979 following the sharp increase in the absolute level and volatility of short- and long-term interest rates. Much of the Savings and Loan industry's capital was wiped out between 1979 and 1981 when 20% per year interest rates prevailed5. Those thrifts that survived realized that fixed-rate loans are exposed to a high level of interest rate risk and therefore should not be held on their balance sheet but instead be sold into the secondary market. This change in mode of business greatly expanded the role of the government-sponsored enterprises that had been created in the late 1960s.

MARKET STRUCTURE

The U.S.A. has a primary residential mortgage market for the retail origination of single-family loans whose collateral is real property [that is the land and the building(s) on it]. Savings banks and savings and loan (or thrift) institutions were the main sources of funds for this purpose-utilizing the balances of their depositors. While deposits are still a source of funds today, the capital markets provide most of the monies for housing loans via the privately owned, government-sponsored enterprises (GSEs) like Fannie Mae, Freddie Mac, and the Federal Home Loan Banks. Separately, the Federal Government fully guarantees the mortgages packaged into securities by Ginnie Mae. This structure explains the subdivisions of U.S.A. home loans based on whether or not the loan is conventional or non-conventional (i.e., not insured vs. insured by the Federal Government) and conforming or non-conforming (i.e., not exceeding vs. exceeding an amount computed by a formula that takes into account changes in home prices). Independently there is a totally private market involving the banks, other secondary market conduits, and the mortgage bankers and brokers.

Together these components of the secondary residential mortgage market provide the links between the primary residential mortgage market and the capital markets. The government-sponsored enterprises especially facilitate the flow of funds from investors in mortgage-derivative securities to the primary housing market. Pass-through, mortgage-backed securities (MBSs), are the main type of funding instrument used by the GSEs. The Federal Home Loan Banks, which are wholesale banks, facilitate a deposit-based system of savings and commercial banks, savings and loan institutions, credit unions, and life insurance companies with corporate debt. Among them additional liquidity is provided for the financing of the construction of, and the sale of, residential housing.

The secondary mortgage market is chiefly devoted to whole loan sales. Commercial banks, life insurance companies, pension funds, Wall Street

dealers (who issue whole-loan and private-label MBSs, structure more complex REMIC deals, and so forth), are active in the secondary market as are the GSEs. There is also a part of the secondary market which deals with less than excellent credit rated loans, home equity loans or second mortgages, and liens on manufactured housing.

Advantages of the Secondary Market and Funding

The U.S.A. secondary residential mortgage market and particularly the GSEs:

* Assist in smoothing out imbalances in the availability of mortgage funds across a geographically large, economically diverse, country.

* Allow lenders to originate mortgages for sale rather than retain them for portfolio investment. This frees their capital and permits them to structure their balance sheets in risk-minimizing, profit-maximizing, ways. Also, by re-supplying the banks' funds, they can originate more mortgages thereby increasing their fee-related income.

* Attract investors to mortgage-related investments via standardized product definition, underwriting, and MBSs backed with homogeneous collateral.

* Provide greater liquidity by financially engineering securities to meet the cash flow needs of investors (e.g., stripped MBSs and REMICs; a REMIC is a multi-class, structured-security backed by MBSs).

* Increase the affordability of home owning by creating a larger supply of less expensive funds with Government or GSE credit guarantees, and

* Closely tie mortgage **rates** to other fixed-income interest **rates** (particularly the 10-year U.S. Treasury **Note**).

Finally, another advantage of the GSE-sponsored MBS markets is that there exists a very wide range of retail products. Fifteen-, 20-, and 30-year fixed-**rate**, 30-year **floating**-**rate**, various hybrid types, re-set balloon, government-guaranteed, and so on are all available to be pooled into MBSs or REMIC classes. This means that short-, intermediate-, and long-term REMIC tranches may be carved out to satisfy investor demand. Hence, sundry investor requirements with respect to interest rate, credit, and pre-payment risk can be met by the various classes of a REMIC.

Private conduits also purchase mortgages to re-package them and sell them to fixed-income investors. In addition, private conduits provide a secondary market in the non-conforming and sub-prime (less than good to excellent credit) markets. Whole-loan conduits also specialize in transforming conventional mortgages that exceed the lending limits imposed on the GSEs into whole-loan securities, dealing with liens from borrowers with less than perfect credit ratings, home equity loans, second mortgages, home improvement loans, and so on. MBSs not issued by GSEs (the so-called non-agency MBSs) have much wider spreads in term-to-maturity, coupon rates, and so on than agency versions (e.g., mixing 15- and 30-year liens together). In addition, whole-loan MBSs typically have external (i.e., private) insurance guarantees or internal credit enhancements (e.g., via a senior/subordinate structure) to allay the fears of investors with respect to default risk.

LEGISLATION

The U.S.A. Congress created the Federal Housing Administration as part of the passage of the National Housing Act (NHA) of 1934. The Federal Housing Administration encouraged investors to lend for residential home purchasing by offering them default insurance. However, only those mortgages (and borrowers) that conformed to the FHA's homogeneous underwriting standards could be eligible. Thus, the FHA created the first uniform mortgage application and underwriting requirements. This standardization dramatically increased the efficiency and liquidity of the secondary mortgage market. In addition, the FHA invented and promoted the fixed-rate, fully-amortizing, long-term, level-payment, monthly-paying, home loan. The standard term of 30-years meant manageable monthly payments. The fixed-rate/level-payment aspects stabilized housing expense making it

easier for consumers to budget. The complete amortization feature meant that the home owner would (albeit slowly at first) build up equity in their property and eventually to own it outright.

In 1938 the U.S. Congress created the Federal National Mortgage Association to supply the credit guarantee and liquidity to the secondary mortgage market. In 1968 Congress divided this organization into two: A government-sponsored derivative, now known as Fannie Mae (a federally chartered corporation owned by private shareholders), and the still wholly Government-owned and controlled Government National Mortgage Association or Ginnie Mae. Ginnie Mae took over the old Fannie Mae's responsibilities with respect to the government-insured mortgage market. Ginnie Mae securities are backed by the full faith and credit of the United States Government.

The partially privatized Fannie Mae was made fully private in 1970 and authorized to purchase conforming loans. Thus, there was a government agency to support government-insured loans and a GSE to support non-government insured loans (up to an independently mandated maximum loan amount).

Ginnie Mae created the first publicly traded pass-through security in 1970. This instrument enabled bankers to sell mortgages in larger volumes to new mortgage investors. It also brought about greater liquidity than had existed in the whole loan market. Separately, in 1970, Congress created Freddie Mac to provide further liquidity to the conventional secondary residential mortgage market. Initially Freddie Mac was a government-charted corporation owned by the twelve Federal Home Loan Banks. Freddie Mac was authorized to purchase conventional loans as well as government-guaranteed liens. Freddie Mac issued its first pass-through MBS, known as a Participation Certificate, in 1971. (The Bank of America issued the first whole-loan, or private, MBS in 1977.) Fannie Mae started to issue its MBS in bulk in the mid-1980s. Freddie Mac introduced the first Collaterized Mortgage Obligation (CMO) in 1983. Three years later CMOs were transformed into the more tax-advantaged, more flexible, Real Estate Mortgage Investment Conduit (REMIC) structure.

The Federal Home Loan Bank System

There is an entirely separate GSE home loan funding system in the U.S.A. under the aegis of the twelve Federal Home Loan Banks. These are independently operated (wholesale) banks established in 1932. The regional banks are owned by their private member institutions and the FHLBank network operates on the private capital they provide. The FHLBanks provide financing support to about 7,900 institutions: 5,750 commercial banks, 1,500 thrifts, 550 credit unions, and 50 insurance companies.

The FHLBanks raise money by issuing corporate debt. These funds, known as advances, are lent to members at lower rates than are available to these institutions individually in the commercial markets. As of mid-2001 the FHLBanks had about $665 billion in assets and $450 billion in advances5.

LOAN TYPES and PRE-PAYMENTS

Home ownership in the U.S.A. is relatively high at about 68% because of a comparatively cheap source of funds provided by the GSEs. The market for home loan securities is huge, over $6 trillion. Most mortgages in the U.S.A. are fixed-rate, fully-amortizing, 30-year, level-paying, monthly-payment instruments. Both shorter- and longer-term product types exist as do bi-weekly payment mortgages. Adjustable-rate mortgages and various hybrid versions with mixed fixed-rate and variable-rate elements comprise approximately 20% of outstanding home Ioans5. The fixed-rate aspect refers to the interest rate being constant (as opposed to floating) for the life of the loan. In general there are no pre-payment penalties or time constraints on pre-payments in an American residential mortgage (i.e., the home owner has the full exercise rights of an American-style call option on their debt). This option is paid for in the note rate. Fifty basis points was the typical amount that this call option used to cost the borrower (post-Russian 1988 default it has doubled).

THE DUTCH MORTGAGE MARKET

The mortgage market in The Netherlands has become a highly dynamic

one. Substantial growth, an increasing interest in the secondary market, and a sharp rise in the variety of loan types available to consumers all illustrate the rapid changes. During most of the 1980s the linear and annuity mortgages were the most popular mortgages types. (The former has a constant periodic principal payment amount whereas the latter amortizes.) In the 1990s the life insurance and savings mortgages became the favorite product types because of their tax advantages6. With the savings mortgages no principal is re-paid during the term of the contract. Instead, the borrower makes interest payments on a regular basis to the lender. The main benefit is that the payments are interest-only which are fully tax deductible under Dutch law. On the other hand, the return on the savings and investment accounts are, under certain conditions, not taxed. Hence, these products take optimal advantage of the Dutch tax system6. The interest re-set date on most loans is 5-10 years after origination with a 30-year amortization period, much like in Canada.

In more detail, with the savings product one pays only the interest on the mortgage amount and a premium into a saving account. It is also possible to invest one's savings as a lump sum at the beginning of the term so that there are no monthly premiums. No principal payments are made during the life of the loan; instead a one-time savings account deposit is expected to grow to equal the mortgage balance on their common maturity/due dates. The deposit earns interest and also pays the premium for a life insurance policy; another credit enhancement mechanism to guarantee the pay off of the principal. This product has significant tax advantages. The bank pays an interest amount over its standard deposit rate equal to the mortgage note rate. Hence, apart from the tax effects, a savings mortgage is comparable with an annuity mortgage. Each time the mortgage interest rate is adjusted, the savings premium will be adjusted as well in order to guarantee the insurance payoff by the due date. As the mortgage interest is coupled to the savings premium, the savings premium will get lower when interest rates rise and higher should interest rates fall.

TODAY'S MARKET

The benefits of the euro and a large, common, financial market have been realized in the search for home loan funds for the 16 million residents of Holland. A reason is that the Dutch Central Bank allows for favorable treatment of assets taken off balance sheet thereby encouraging the issuance of MBSs. The first securitization of residential mortgages in The Netherlands was carried out early in 1996 profiting from both of these developments. Fifteen MBS transactions occurred up to September, 20006. During the last half of 1990s home loans amounting to euro 8.7 billion were transferred to the special purpose vehicles (SPVs) used to hold the assets. The function of the SPV is to keep the collateral separate from that of the original lending institution6.

The progress in the housing and mortgage markets in recent years has generated a sharp increase in outstanding residential mortgage debt. Mortgage debt grew by the year-end 2001 to euro 320 billion. Mortgage-backed assets in SPVs accounted for only about 10% (euro 30 billion) of the total growth in outstanding residential mortgages. This can be attributed to the fact that under Dutch law any true sale of receivables must involve the notification of the borrower. Rather than potentially antagonize their customers, most lenders are loathe to do this. Also, under the Dutch civil code, there is no concept of a trust; that is the law does not recognize a distinction between legal and beneficial ownership.

The Dutch system of tax deductibility on mortgage interest payments makes buying a property particularly attractive especially with rents rapidly increasing. Just over half of Hollanders own their own homes with their mortgage debt being the fourth largest in Europe after Germany, the UK, and France. The Dutch fiscal system also allows tax deductibility on a range of costs associated with the initial purchase of a property. For the consumer, buying a house is expensive; the closing costs are approximately 25% of the price. These are composed of a value added tax of 17.5%, legal transfer costs of 6%, real estate agent fees of 1.5-2.5%, and notary fees

of 1.5%. The per capita home loan debt in The Netherlands is the second highest in Europe after that of the Danes with loan-to-value ratios normally 80-85% at the time of purchase6.

The usual rule-of-thumb in the Dutch market is that one can borrow up to four times their annual income. In certain circumstances the limit is 125% of the "execution value" of the property. This amount is lower than the perceived actual value of the property and reflects the lowest amount the house would sell for if repossessed.

Pre-payments

Dutch mortgages usually have a maturity of 30-years with the interest rate fixed for a period of between 5- and 20-years. At the end of each fixed-rate period the mortgage rate is re-set to the market rate. Usually there are no caps nor floors restricting the interest rate adjustments at the re-set date. With regards to pre-payments, at least 10%, and as much as 20%, of the initial principal can be pre-paid within any calendar year without pre-payment penalties. Above the annual permitted pre-payment, additional pre-payments are settled at costs equal to the present value of the difference between the future monthly interest payments of a new contract and the existing mortgage. An additional fixed amount, of 6-14% of the outstanding principal balance, is added to this penalty. Hence, pre-payments in Holland are minimal.

CONSUMER ISSUES

Types of Mortgages

As mentioned above, there are two basic types of re-payment mortgages. They are referred to in Dutch as lineaire and annuiteiten. In addition, there are two basic types of investment mortgages, savings (spaar) and investment (belegging). With the investment **security** one pays only the **interest** on the mortgage amount and a premium into an investment fund. The return on the investment account (e.g., stocks and shares) does not relate to the note rate nor to the rate of return of the insurance company. In 1998 the market share of the investment-type mortgage exceeded 50% of the newly issued home loans6. More recently, so-called "switch mortgages" have become popular. With this product mortgagors can alternate between building up the principal amount through a savings account or by an investment account.

There is a third type of mortgage known as the non-re-payment mortgage or aflossingsvrij. This is an interest-only variety and is not available for the entire loan amount. Separately one makes arrangements to pay the mortgage balance on its due date. It is possible to combine the above mortgage forms and have a tailor-made mortgage.

Another variety is a life insurance mortgage where one pays interest only. The balance is made from a so-called "mixed life insurance policy" issued by an insurance firm. The outstanding amount is made on the final due date or when the insured has died. Instead of traditional mortgage payments, the mortgagor pays a monthly insurance premium. At the end of the policy term the life insurance premium plus interest is designed to pay off the home loan. Since no principal re-payments are made during the life of the loan, the interest portion remains constant computed on the full amount due.

Last is an interest-only home loan. At the mortgage's maturity the entire amount is due (i.e., a balloon mortgage). Interest-only mortgages are only granted if there is sufficient excess value in the collateral. At the end of the term, principal re-payment is made through the sale of the property, by taking out a new mortgage or by individual savings. Due to the higher credit risk, Dutch mortgagees never grant an interest-only loan that exceeds 75% of the foreclosure value of the underlying property. Often, this type of loan is used as a second mortgage (e.g., to finance renovation). In the second half of the 1990s, the interest-only and the investment mortgage became popular6.

In 1995 the National Mortgage Guarantee was established to encourage home ownership. It succeeded the municipality mortgage guarantee. It is an instrument of the Home Ownership Guarantee Fund Foundation (Stichting

Waarborgfonds Eigen Woningen). Under certain conditions a home loan can be guaranteed against default risk.

SUMMARY

We have surveyed four different fixed-rate home loan systems. All of them with fixed-rate home loans and some government intervention in the mortgage markets. The Danish borrower has a fairly sophisticated financing decision to make between bond and cash loans (over and above the fixedvs. adjustable-rate choice). Moreover, should they choose to re-finance, they again have a complex computation to perform to validate that re-financing is really the best economic choice. Finally, the ongoing fees associated with loan servicing are relatively high. In contrast the Canadian mortgagor fully faces interest rate risk with the intermediate-term, partially-amortizing, product plus a slew of pre-penalty options which depend on frequency, amount, and so forth. Because of the high volatility of Canadian interest rates home owners there are typically paying more than home owners in the other countries we have discussed for their housing funds. While investors in Canadian mortgages are reasonably well protected, the high costs associated with this protection are fully borne by the home owner and, potentially, the Canadian government.

In Holland the wide variety of, effectively, interest-only, home loans in connection with their tax advantages, attracts many consumers. Not only can their periodic housing payments be minimized, the attractiveness of this feature is enhanced by the tax laws. However, any buildup of equity in their property would be minimized and postponed. Hence, "home ownership" does not necessarily mean quite the same thing in Holland as in the other countries we have examined. Given the simplicity of the process, lack of interest rate risk, relatively low level of government involvement, it appears that the consumer in the best overall situation is the American one, especially with regard to pre-payments or curtailments.

In the U.S.A., because of the no pre-payment penalty nature of the standard 30-year, fixed-rate product, re-financing rates have risen to all-time highs as interest rates have fallen to forty year lows. (Re-financing is a third higher than the previous record levels set during 1997-98 with almost $3 trillion re-financed in 2002(7).) In addition, the huge benefits that the American home owner derives from the multiplicity of competing funding systems and default insurance programs (i.e., Government, GSE, and fully private) have kept home loan rates low, and uniform, across a geographically large area for a European-sized population. The large, integrated, capital market with a variety of investment mechanisms, especially MBSs, has diversified funding sources and spread interest rate (and pre-payment) risks while the tripartite guarantee business has kept costs for home owners down and government intervention low.

NOTES

1 See the article by Judith Hardt, "European Mortgage Markets: Structure, Funding and Future Development," in European Mortgage Federation, 2000.

2 The Association of Danish Mortgage Banks, RealKrediradet, is a good source for general information on the Danish mortgage market (their Web address is www.realkreditraadet.dk). There one can find English versions of their publications Danish Mortgage Bonds and Mortgage Financing in Denmark. The basic reference is the Danish Mortgage Credit Act itself.

3 Typically this is accomplished by the home owner purchasing the desired amount of outstanding MBBs, from the relevant series, themselves and turning them into the mortgage bank to diminish, or eliminate, their outstanding mortgage debt.

4 The Canada Mortgage Housing Corporation is a useful resource especially its publication on Canada's Housing System and The NHA Mortgage-Backed Securities document. Its Web address is www.cmhcschl.gc.ca. www.canadamortgage.com has an excellent set of resources too as do several other Canadian commercial bank Web-sites such as www.mortgage-made-easy.com and www.great-mortgages.com (the Ontario Mortgage Centre Ltd.)

5 Taff, L. G., Investing in Mortgage Securities, is the main source of

the material on the American market. St. Lucie Press, 2003.

6 The Netherlands Bankers' Association and the Nederlandse Bankeirsverenignin Web sites were very useful sources of information for this section.

7 Washington Post, December 27, 2002, pg. E1.

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Finance Tools Multiply in Jumpy Market

The Bond Buyer - May 18, 1982, Tuesday, ; Pg. 1
Dateline: WASHINGTON, May 17
Word Count: 1,319

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By Gretchen Chell

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High interest rates and market uncertainty have spawned a plethora of new tax-exempt financing techniques, creating new funding for state and local governments but also providing pitfalls.

A number of new financing devices, especially tax-exempt commercial paper, has gained complete market acceptance in a short time span while others, such as tax-exempt agriculture bonds, have been curbed quickly by the Internal Revenue Service.

Creative financing essentially is a creature of uncertain markets and hard-to-sell investors. Issuers are being placed in the position of accepting and dealing with future market uncertainty, a burden formerly assumed by investors.

In the May edition of Resources in Review, a publication of the Municipal Finance Officers Association's Government Finance Research Center, two financial advisers outlined the latest financing devices in the tax-exempt sector. But they warned issuers to be wary about moving away from traditional financing.

Whether using new or standard borrowing methods, two approaches should be taken when tapping the municipal market, the article said: borrowing at the lowest rates within the context of future liquidity needs and revenue forecasts, and using a debt instrument attractive to investors without

high risks to issuers.

Lawrence Shubnell and William Cobbs, independent financial advisers with Government Finance Associates Inc., of Princeton, N.J., cautioned issuers against using new financing methods. They advocated more conventional approaches, unless issuers are sure the rewards of the new methods are worth the risks.

The new devices create stockpiling of short-term debt and are therefore more difficult to refinance since everybody will enter the market about the same time.

Creative financing also is often associated with off-the-balance-sheet debt and the segregation and restriction of funds. This can impair a government's fiscal flexibility by tying up money otherwise available for general purposes and serve to make reporting and understanding a government unit's financial condition more difficult.

"But, while there may bo no free lunches, careful and knowledgeable scrutiny of the financing may turn up some specials that prove to be real bargains," Mr. Shubnell and Mr. Cobbs said.

Twenty-six issuers have come to market with tax-exempt commercial paper, making it the most successful new method, and an estimated $1.7 billion of tax-exempt paper is outstanding.

Drawn from corporate commercial paper, tax-exempt paper is basically short-term, temporary unsecured notes with a bank letter or line of credit that are rolled over every 15 to 30 days until permanent financing is put in place.

Tax-exempt paper is most adaptable for seasonable borrowing needs or financing an ongoing capital spending program until permanent financing is needed or affordable.

Despite its flexibility and low-interest rates, paper can only be issued by issuers with good credit ratings and also in amounts more than $20 million.

The most recent of the innovative financing methods is the stepped coupon bond. These bonds feature a maturity structure and interest coupon designed to lower the interest cost to the issuer and protect the investor's principal.

The device uses a serial maturity scheduled with coupon rates with low early year rates that progress upward. All the bonds in an issue -- regardless of maturity -- bear the same rate of interest in any one year.

More bonds may mature in the early years which will lower the average life of the issue. This would save the issuer interest payments because the new bond structure allows lower early-year coupon rates.

The stepped coupon bond is best suited to finance projects requiring capitalized interest.

Floating **rate** debt instruments, adapted from the Eurocurrency markets, gained popularity when interest rates became volatile several years ago. For the most part, these devices have interest rates that are **variable**.

Using floating rates places the risk of interest **rate** fluctuations on the issuer rather than on the purchaser and can attract buyers who do not want long-term fixed **rate** instruments,

particularly if **rates** are on the upswing.

One well-known example of **floating rate** financing is the Flexible **Rate** General **Obligation** Certificates of Indebtedness secured by the full faith and credit of the state of Washington. Although issued as one-year **notes**, investors may either tender the certificates every 30 days or roll them over at prevailing interest **rates**.

Another **floating rate** issue is the **Variable Rate** Student Loan Revenue Bonds sold by the South Carolina State Education Assistance Authority as special **obligations** and backed by insured student loan payments. The bonds mature in 17 years and pay interest quarterly calculated at a rate pegged to that paid on Treasury bills. Similar issues have been offered by student loan authories in Kansas, Kentucky, Minnesota and Virginia.

Zero coupon bonds are similar in structure to U.S. Government savings bonds in which bonds are sold at a discount and the interest is paid when the bond matures. The investor accepts a lower than market rate return for an extended period because of the guaranteed fixed rate of return, but the issuer receives much less cash up front than by issuing a bond at par.

Put option bonds allow investors to tender their bonds back to the issuer at par at the end of a specific period after the sale date, usually five to ten years. For issuers, the tender feature, or put, places issuers at a substantial refinancing risk and requires a letter-of-credit.

Bonds with warrants were first used by the Muncipal Assistance Corp. of New York, but the financing technique has not made any impact on the municipal sector.

A warrant lets the bond holder purchase additional bonds at a fixed discount price during a specified period, thereby providing a "reverse call" on the **security**. Because warrants pay no **interest**, they do not have intrinsic value unless the market price of the securities rises above the call price. From the issuers' standpoint, the willingness of investors to purchase such an option provides the chance to lower the cost of borrowing.

A variety of tax-exempt leasing has been accepted as a financing technique for purchasing property and equipment and as an alternative to tax-exempt bonds.

Carrying a wide range of labels, the more popular tax-exempt forms include:

* Operating lease: A rental agreement between a user and owner of an asset.

* Capital lease: A lease of a capital **assets** treated as a sale.

* Financing lease: A lessee negotiates a **purchase** with a supplier of property ans simultaneously arranges for a bank of leasing company to buy the property.

* Sale-Leaseback: An arrangment in which the owner of an asset sells the asset to a financing entity and then leases the asset for a fee.

* Leveraged lease: This arrangements involves the use of debt and equity capital. Similar to a financing lease of sale-leaseback, this device uses a small amount of equity contribution as the leverage.

* Safe harbor leases: Made popular by last year's tax law, these leases transfer ownership of an asset to a lessee at the end of the lease term for a fee while giving the lessor the tax benefits of ownership in the meantime.

Because creative leasing arrangements are often new, many are not founded on well-established practices and some may be considered on the fringes of the law. The Resources in Review article urged municipal lessees to "keep a sharp watch for shifting legislative and regulatory sands and be prepared to move fast."

One other new financing technique not mentioned in the Resources' in Review article, is small denomination bonds, dubbed "minibonds," which made they market debut in 1978.

These bonds are generally issued in units of $100, $500 and $1,000 and sold by the issuers without using an underwriter. Marketing is directed at local, small investors who normally could not afford to buy bonds because of the highminimum denominations. Like U.S. Government savings bonds, the bonds are sold at a discount and the interest is paid at maturity.